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Review

Five Basic Cornerstones of Sustainability Education in the Arctic

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Abstract: The Arctic region faces many threats but also opportunities due to economic, climate, environmental, cultural, social, professional, educational, and institutional changes, which also necessitate new perspectives on sustainable education. When implementing sustainable education in the Arctic, it is important to increase knowledge and understanding of the special features of Arctic areas—their opportunities and vulnerabilities. In this article, the model of Arctic sustainable education (ASE) has been introduced. It is based on a new kind of lifestyle that illustrates respectful and responsible attitudes toward other people and nature. What are the special features of the teaching and learning of ASE and how to organize it? In this theoretical article, we have discussed the challenges and goals, and possibilities and significance of ASE by leaning on the five cornerstones, concerning learning and teaching of SE in schools and organizations: why, what, how, who, and when. The ASE may provide new ideas to develop sustainable education not just in the Arctic region but also elsewhere as it gets its special opportunities and expectations in a context- and time-bound manner. In conclusion, the role of educational psychology in ASE has been viewed and discussed.

Keywords: learning; teaching; sustainability; sustainability education; Arctic

1. Introduction

The Arctic represents one of the regions of the world where the human-environment relationship is a common basis of the identities, cultures, and welfare [1]. The area is extraordinary both culturally and in terms of climate and fauna. That geographic power and the Arctic resources can easily shape the social life of its inhabitants [2,3]. Today, the region is changing through rapid environmental and economic development, posing a threat to nature and traditional and indigenous cultures. While the change is seen as a source of local conflict, it can also be an opportunity for new investments that bring employment, resources, and welfare [1].

The Arctic is a polar region located at the northernmost part of the Earth, consisting of the Arctic Ocean and parts of Alaska (United States), Canada, Finland, Greenland (Denmark), Iceland, Norway, Russia, and Sweden. We are based in Finland, and therefore, we draw from our cultural and societal perspectives when discussing the ideas of sustainable education in the Arctic region. The area of Finland that is located in the Arctic is called Lapland. The population consists of mainstreaming people (the Finns) but also of the indigenous people (the Sámi in Finland). This combination is somewhat a common feature of the Arctic countries [3–5].

Lifestyles and cultures in the Arctic area have leaned on a close relationship with nature and respect for it. The ASE is based on critical environmental education that emphasizes the fact that human beings and nature cannot be viewed separately, nor can people control nature. The current economic and technical developments have been seen as a threat because nature is considered technically abusable [6]. Industrialization and unsustainable energy production, among others, are not just worries

that concern nature [7] but also tell about the trend of people alienating themselves from nature [8]. Life in the Arctic area is bound with nature, forests, and waters, and knowledge of various species and how the aforementioned integrate into human beings' lives. Nature is not isolated from the local culture and society, but they form an entity in the Arctic [9]. If this connection is broken, it is a matter of global concern: without a close and caring connection with nature, people will become blind to phenomena, such as extinction, climate change, and pollution [7]. Education can be seen as a key to prevent this from happening.

Sustainable learning and education can be seen as a life-long, life-wide, and life-deep endeavor regardless of whether it takes place in school, at work, or in leisure [10]. One aspect of sustainability is the way technological solutions make an important part of everyday contexts and learning environments, also in the Arctic area. In addition, phenomena, such as the aging population, social exclusion among the youth, concentration of the population to larger cities, chronic-levels of unemployment, the lack of informal educational opportunities, and the challenges of how to provide formal education in a sustainable manner in areas where only a handful of children reach school-age every year and where distances are long in sparsely-populated areas, also contribute to everyday contexts and learning environments. On the other hand, changes in livelihoods, economic structures, and natural resources—the number of mining towns, increasing tourism, new business innovations, and social and educational innovations, such as distant learning solutions—are the future success of Arctic [10].

The population of the Arctic increased rapidly, along with better health care and the use of natural resources in the 1950s and 1960s. However, during the past years, the growth of the population has decreased, but, on the other hand, the population has become more diverse [3]. The nature of the Arctic area, such as the cold temperatures and huge variation in the amount of light, molds people in the Arctic function. Long distances set various limitations to the everyday lives of people but also to enterprises [11]. Likewise, the cultural special features of the Arctic (mainstreaming, indigenous, and immigrant populations) present certain expectations to the cultural sensitivity of education [12]. The aforementioned situation presents several challenges for education and learning. The questions of education in remote and sparsely-populated areas (including the small number of students, long school commutes, availability of competent teachers, etc.) [13] should also be considered from the viewpoint of sustainability.

Challenges related to sustainability are often quite multidimensional, complex, and intertwined in nature [14]. Thus, sustainability education in the Arctic does not actually concern just the Arctic region but all regions, people, and nations globally—given that the goals of such education can only be met in a manner that fits the local context. It is based on a long historical development and will face the future that is constructed as a combination of various factors. The purpose of this article is to discuss what the special features of teaching and learning of Arctic sustainable education (ASE) are and how to organize it. First, we have focused on the special features of teaching and learning in the future Arctic contexts, followed by issues of organizing the sustainable education in the Arctic so that education can best support the well-being of people living in the Arctic and thus also contribute to the vitality of Arctic regions. This article introduces the essence of sustainability education in the Arctic by introducing its challenges and goals, possibilities, and significance. We have introduced the model of sustainability education by focusing on its key questions of learning and teaching. In conclusion, we have highlighted the importance of educational psychological knowledge as a means to enhance a profound understanding of sustainability [15,16].

2. The Arctic Sustainability Education (ASE)

The challenge of sustainability education is to educate about the limits of our living space and environment, to teach how to understand and control it. Teaching should be based on the overarching understanding of how people, communities, ecosystems of nature, and the whole biosphere are intertwined and how well-being is dependent on the well-being of all these parts. Any singular

environment, system, or organization and their sustainability problems cannot be seen separate from others.

A great challenge of education is to find a means to teach and learn to understand sustainability questions and solve related problems. But even that is not enough as Agyeman [17–19] suggests: it is necessary to realize that a sustainable society must be a just one. Social and environmental justice within and between nations should be an integral part of the policies and agreements that promote sustainable development. Sustainability in the Arctic, therefore, in the light of Agueman's thoughts, means also equality by increasing the well-being and quality of life among people living in the Arctic by noticing the human potential in the current and next generations and recognizing others' cultural rights, diversity, and cultural identities. Social justice should be a natural part of the ASE, which inevitably means that the ASE is not just about information and distribution of knowledge but is culturally inclusive (see also [17–19]). This gives us an overview of what wide phenomenon sustainability covers at the end. Wiek, Withycombe, and Redman [20] call this a "wicked" situation, which necessitates transformational action in participatory, deliberative, and adaptive settings in order to achieve the critical key competencies of sustainability. The goal is to enable people to plan, conduct, and engage in sustainability research and problem-solving based on the interplay of systems' thinking, anticipatory, normative, strategic, and interpersonal competencies [20].

One solution is to turn the focus on the way people accumulate information about sustainability and turn it into knowledge. Profound understanding requires deep learning in which people extract meaning and understanding through a range of environmental, social, and economic issues [21]. At its best, deep learning is based on and leads to an understanding of the importance of interdisciplinary thinking and holistic insight. Thus, according to Warburton [21], deep learning is particularly relevant in the context of education for sustainability.

The ASE cannot be a detached school subject educated in a particular manner to students but a cross-curricular content that makes students of all ages sensitive to the relationship with nature and experiences in the environment [22]. The western schooling is traditionally divided into school subjects and fields of science, which, on the one hand, has allowed branches of science to develop, but, on the other hand, made it difficult to perceive sustainability questions in a holistic manner [23]. We have perceived the ASE as an aspiration to view the large picture from an educational perspective: how are the parts of sustainability education in interaction with each other (see also [24]).

How to make lifestyles, societal structures, and utilization of natural resources meet sustainability demands? How can educational solutions help these aspirations? Could the Arctic sustainability education (ASE) be the bellwether?

Next, we have discussed ASE through its five fundamental cornerstones: (1) Why do we need ASE?; (2) What does ASE consist of?; (3) How to implement ASE?; (4) Who do implement ASE?; and (5) When is ASE be provided?

(1) Why do we need ASE?

The objective of ASE is to strengthen the future skills of Arctic people and communities by promoting communality, collaboration, problem-solving skills, and opportunities to active, local, and culture-bound learning of sustainable development. Through increasing technological skills, learning becomes more versatile, but in addition, the utilization of technological solutions enables profound participation and supports equality. It also creates a learning environment that promotes formal and non-formal learning across generations and their cultural heritage. Teaching will employ various methods, such as peer-learning and physical and virtual spaces.

The learning environments of the Arctic area cut various borderlines that are physical but also mental, cultural, regional, geographical, educational, and linguistic. Borderlines are crossed in terms of natural environments, the traditional and modern technological contexts, and the development of livelihoods in the Arctic. The ASE aims to provide such opportunities for teaching and learning that crosses the aforementioned lines, pays attention to possibilities of the social media and technological

solutions, engages people of various age in the local, regional, and global sustainable development, and life-long, life-wide, and life-like sustainability thinking regardless of whether it takes place at school, at work, or in leisure. It also means that the ASE pursues to increase active citizenship [25].

The level of Arctic information is exploding and updating all the time. The ASE is based on the idea that information finding skills are essential for learning accompanied by critical information analyzing skills (such as media literacy) [26] (see also [27]). The ASE is not just about transmitting Arctic information or knowledge about sustainability but encompasses awareness, knowledge, skills, attitudes, and participation [28]. Societal demands mold the expectations for the expertise and learning all the time. The ASE focus is on such basic skills and attitudes that promote the adaptation of pro-environmental thinking and positive sustainability attitudes. Arctic information would be utilized widely, which provides good premises for learning the critical core questions of the future, preferable attitudes, and renewal of ways of action.

(2) What does ASE consist of?

ASE is realized through curricula and contexts of teaching that are aligned with objectives of sustainable development.

The curriculum for education defines the goals and objectives for teaching and names the principles for how to teach. The curriculum has a role as a juridical and an administrative document, but it also transmits topical information and guides the pedagogical activities. In Finland, the curriculum commonly refers to the National Core Curriculum of Education as well as local municipal and school-specific curricula at various educational levels. The general part of the curriculum already notices the principles of sustainability education:

> *"The school as a learning community is part of a culturally transforming and diverse society where the local and the global overlap. Different identities, languages, religions and worldviews coexist and interact. Internationalisation at home is an important resource for a learning community. The community appreciates and draws upon the country's cultural heritage and national languages as well as cultural, linguistic, religious and philosophical diversity in the community itself and in its environment. It brings up the importance of the Sámi culture and various minorities in Finland. It promotes understanding and respect between individuals and groups as well as responsible action."* ([29], p. 29)

At the curriculum level, the ASE should also define a cultural objective of basic education, which defines the objective of basic education as promoting diverse cultural competence and appreciation of one's cultural heritage, identity, and capital [30]. School culture can be described as utilizing and appreciating the Arctic region's cultural, linguistic, and religious diversity. The cultural perspective of sustainability should be visible in subjects and the general goals [31]. Laine [31] talks about cultural sustainability, which means understanding different customs, languages, and cultures in a globalizing world, readiness regarding creativity, skills related to self-expression, hand and body skills, and being conscious of one's own identity. Culturally sustainable covers micro-, median-, and macro-level contacts and considers culture on the local, national, and global. In addition, it recognizes the value of culture in the cultural change toward sustainability [31].

The curriculum guides teaching and learning, also when it comes to evaluation. Therefore, it is important to pay attention to the means of how to evaluate the adaptation of knowledge about Arctic sustainability [32]. Recent findings indicate that the levels of understanding about topics related to sustainable development (e.g., climate change see [16]) vary considerably among students in basic education. Understanding this kind of variation is important when designing ways to evaluate learning in ASE.

The ASE means a wide contents' renewal and unitization of information about sustainability in the Arctic in various school subjects and across the different levels of the curriculum. The special features of Arctic sustainability can be included in teaching as specific contents and as cross-curricular themes. This is how the foundation of sustainability pedagogy is created in a way that draws from the

regional special features and provides students with skills to perceive the opportunities and strengths of the Arctic learning and future success.

What, then, are the core contents of ASE? McBride et al. [33] list possible contents, such as discourses on the nature and essential components of environmental literacy, ecological literacy, and eco-literacy. Critical environmental education [34] has focused on a dualistic worldview in which human beings and nature are seen as strictly separate and people as having control over nature. This kind of attitude presents nature as something separate, technically manipulative structure [35]. Although critical thinking is important to teach to students, just being critical or a change in attitudes is not enough. This was highlighted also by Gruenewald [36] when he introduced the thinking of critical pedagogy of place.

Making sustainable attitudes meet with the action, and learning of responsibility is a key content of ASE, too. Students' understanding about the importance of the sustainable development of the Arctic and their own everyday actions—how they can influence and why it is important to make the difference through even small, everyday choices—can be included in numerous ways in the teaching contents (see also [37]).

(3) How to implement ASE?

The methods of ASE can be defined as activities and pro-environmental action embedded in versatile teaching methods and learning environments. The core methods of ASE are based on the opportunities provided by new technology [38]. Wider and innovative use of, for example, online teaching methods and environments can be considered sustainable because the need for commuting long distances decreases, allowing people to stay at their local regions and keep remote places populated.

Methods cover the distance, online, and virtual teaching that take place not only virtually but also in physical places accompanied by online connections that allow small group and peer learning and co-teaching arrangements [39–41]. Methods, such as flipped online classrooms, have been proved suitable and student-oriented teaching solutions [42]. Actually, the idea of ASE expects attitudes to learning and teaching that are not tied with physical places but perceives the variety of methods and learning environments as a natural state of education. It means that virtual education solutions are not something new or extraordinary but normal and ordinary, a solid part of education (see also [43]).

The ASE would also focus on the recognition and employment of students' resources and strengths [44]. The strength-based, caring pedagogical approach of ASE helps to pay attention to individual and communal strengths in formal and informal and physical and virtual learning environments [45]. Students are being motivated and activated through pedagogical solutions that illustrate courage, individuality, and appreciation of differences in people, culture, and contexts ([46], see also [47]).

The key concepts of ASE are inclusion [48,49], innovations, spatiality (physical and virtual spaces), and regionality. When it comes to inclusion, the focus is on the support of participation rather than the prevention of social exclusion [50]. This is considered a guiding idea of sustainable development, also in inclusion. Respect for everyone's unique features and (cultural) backgrounds, theoretical understanding of inclusion accompanied with individual and institutional knowledge and skills [50] illustrate the conceptual foundation of ASE.

Learning environments are also designed so that they support students' positive development physically, socially, emotionally, and cognitively [51]. Therefore, learning environments extend outside the classrooms as a natural part of education ([52], see also [53]). A special emphasis is on the employment of Arctic information in learning environments and teaching methods: for example, familiarization with the local culture, nature, and livelihoods and related study projects are the methods of implementing ASE. According to Albrecht and Karabenick [54], this also increases the relevance of learning material.

(4) Who does implement ASE?

ASE would be implemented by teachers and teacher educators, pedagogical leaders, and multi-professional and wide collaboration.

For teachers and teacher educators, ASE means not only subject-specific contemplation of Arctic sustainability questions but also pedagogical skills related to caring teacherhood [55,56], especially interaction skills and ability to recognize and support students' strengths [57]. Teacherhood becomes embedded with a fundamental understanding of sustainability in teaching (implementation of education) and in life, in general (social and environmental behaviors) (see also [58,59]). A teacher's cultural compass is a core part of his or her pedagogical expertise [50].

The Finnish teacher training has been appraised highly internationally, for example, due to our success in the program for international students assessment (PISA). Previously, teacher training was one of the most popular professions in Finland [60], but in 2019, the number of applicants to teacher training had dramatically decreased [61]. The image of a teacher profession has become more negative due to recent societal and cultural changes. Could ASE provide one solution to make the teacher profession popular again as it provides a new, explicit perspective on how teachers act for a better future? Previously, the popularity of a teaching profession in Finland was based on the respected position of teachers in the society, which was based on the national project of educating the population and developing the basic education system. Now, the new agenda for teacher training and teaching—or at least an important part of it—would be to educate the population about sustainability, especially in the Arctic regions where the societal and cultural change might be fastest and most drastic. In this sense, teachers and teacher educators are the bellwethers of ASE. As Finland is renewing the teacher training student selection in 2020, the core question has been about what kind of competence is needed for future teachers. One of the competences inevitably is the awareness of sustainability and educational understanding about sustainable development in learners and learning communities.

The ASE is based on the ideology of caring teaching and leadership, which are based on shared leadership, teamwork, and Arctic expertise. Caring leadership defines not only work with students but also between teachers and other education personnel and extends all the way to parents and collaborators outside the school premises [62,63].

Caring can be seen as a method of positive, pedagogical leadership that aims at sustainability in the work community. This ethical aspect of caring leadership affects work outcomes and organizational behaviors positively [64–66]. In addition, shared leadership aims to increase flourishing in the workplace. Hargreaves and Fink [67] call this sustainable leadership that education leaders can adopt. This kind of leadership, as a part of ASE, can engage students intellectually, socially, and emotionally and lead to meaningful learning experiences ([67], see also [68]).

Finally, the ASE is a strong, local approach, aiming at maintaining Arctic information in teaching. Therefore, the local actors—partners, homes, other schools, and professionals supporting education, such as nurses, psychologists, and other health services—form an important multi-professional network that helps to implement the ASE. The relationship between the ASE and the local community is reciprocal because both support each other: the ASE supports the sustainable development and vitality of the region, and the local community supports the implementation of ASE.

(5) When is ASE be provided?

The ASE does not focus just on any specific education level but can become an overarching theme at all levels of education, all the way from early childhood education to basic education, as well as vocational, higher, and adult education. Thus, ASE also represents life-long and continuous learning perspectives.

3. Discussion

3.1. The Cornerstones of ASE

The ASE and its cornerstones are illustrated in Figure 1. At the core, there are the objectives, contents, and methods of ASE. However, as the ASE does not happen by itself, the figure also includes the key actors of implementing it, teachers and teacher educators, pedagogical leaders and administration, and multi-professional collaborators. In addition, ASE does not happen just at one educational level but can be seen as an all-encompassing approach to all forms and levels of education. It is merely a fundamental ideology adopted as a part of education. The ASE draws from the local and extends to the wider society, and eventually is globally adjustable in nature. Therefore, it gets different shapes in different societal contexts and times because not all contexts are at the same level regarding sustainable development and implementation of the Arctic or regional information.

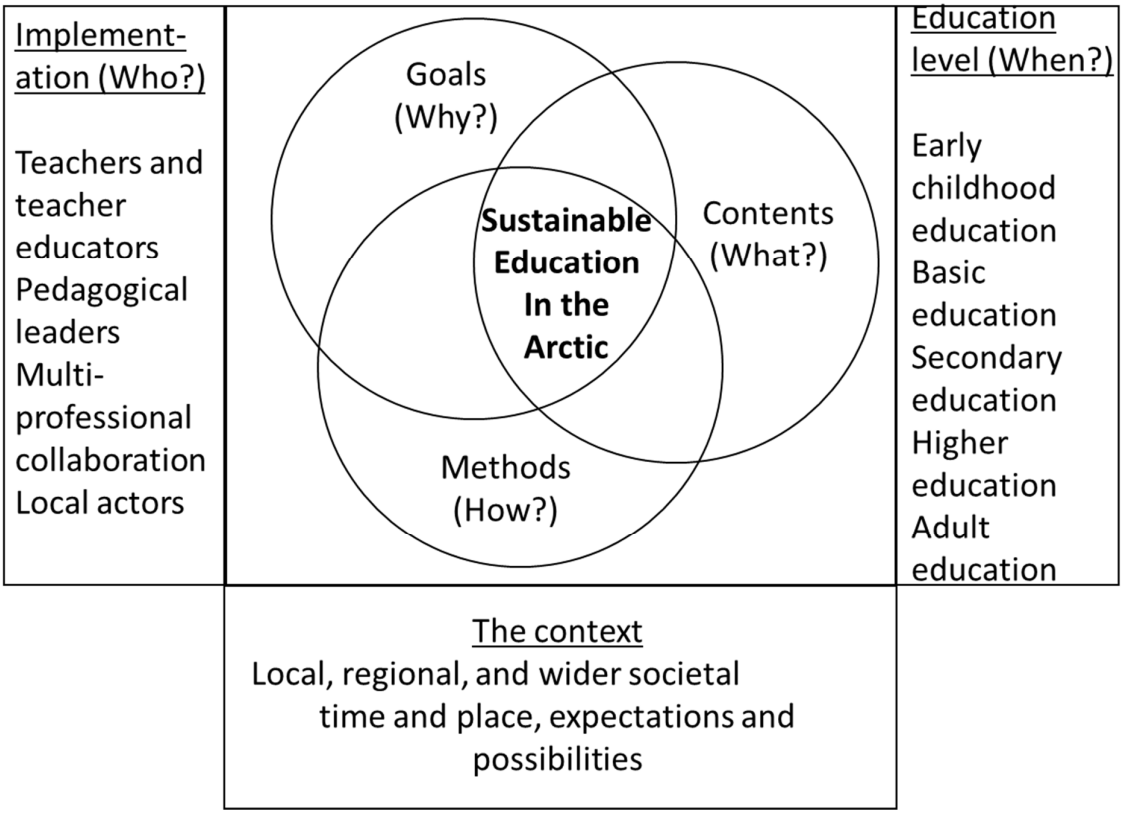

Figure 1. The model of Arctic sustainability education (ASE).

The ASE provides solutions for the specific challenges in the Arctic but also elsewhere. The Arctic area is sparsely-populated, and long distances determine the direction and arrangements of life and schooling. School commutes are long, and the availability of student health care personnel and specialized professionals are topical concerns [69]. Before the technological innovations developed for education, there were boarding schools [70,71]. Now virtual encounters make it possible to, for example, arrange parents' conferences or meetings with multi-professional teams. The ASE-based organization of education would also enhance people's opportunities to stay in their homeplaces without the need for moving to bigger cities. Indeed, the nature and culture of the Arctic area provide special living and developmental opportunities [72]. This necessitates suitable education opportunities [73,74] alongside new livelihoods we mentioned in the Introduction. Likewise, immigrants arriving in the Arctic should be integrated into the northern communities already during their basic education and assured of the opportunities to thrive and make a living in the area also in the future [75].

Sustainable Arctic's future skills would become invaluable. Yet, we realize that it is not easy to renew education, and the old learning and teaching methods tend to be adopted from generation to another. However, we want to emphasize the role of teachers and teacher educators in showing an example, teaching optimism, and providing sustainability skills of the future [76,77]. New teaching methods should be actively tested and implemented, but an open-minded attitude is needed ([47], see also [78,79]. The ASE necessitates methods that focus on the regional special features and seize the modern possibilities. Its fundamental goal is to maintain the vitality of the area in a sustainable manner that covers not only environmental sustainability but social, too. The future of the Arctic areas depends on the versatile and wide-ranging education of its people—on their future skills.

The implementation of ASE also relies on sensitivity and love for work in the Arctic circumstances. In addition, optimism and belief in the Arctic future define the bellwethers of ASE. People and nature in the Arctic have faced many hard phases of change, and resilience, as an important part of sustainability, has its own importance [80]. Smith et al. [81] remind that also Arctic affective dialogue is needed, paying attention to the local, national, and international. We have illustrated the model of ASE, but it needs to be developed through practical experiments and research. For example, action research projects [12,82] in which the new methods are implemented, evaluated, and renewed in collaboration with the implementors of ASE. In practice, this kind of action research would proceed from the operationalization of specific elements of the ASE at the levels presented in this article and Figure 1, and systematically testing the new practices and reporting their usability. This is an important part of evaluating the model. The evaluation of ASE could proceed, for example, by following the idea of appreciative inquiry (AI) [83]. Being a positively-toned model pursuing better life and vitality of the Arctic, the ASE developmental work would benefit from an approach that pays attention to what works and what should be done more: to reach the positive potential and "positive revolution in change" as Cooperrider and Whitney call it [83]. In practice, this would mean interviews, group discussions, and questionnaires, and observations about the whole process of operationalization, implementation, and usability of the ASE with all stakeholders involved.

Through practical research experiments, the theoretical basis could also be strengthened, which again could lead to new practical methods and their testing and widely include it in teacher training, curriculum planning work, and in local and national educational decision-making. The ASE is not fixed or predetermined but must be seen as continuously developing and shaping the approach of education.

The research-based model of ASE can only be transmitted to schools and various levels of education through research-based teacher training [60,84]. When teachers apply the pedagogy in practice, and it is evaluated by research, the approach would be strengthened, refined, and molded according to the Arctic circumstances. Simultaneously, opportunities to employ the model in other contexts, too, could be investigated and developed.

3.2. What is the Role of Educational Psychology in ASE?

We have now discussed the basic structure of ASE, and as has become evident, we perceive it as a comprehensive way of understanding sustainability and how it is being taught. We also mentioned how challenging it is to introduce new methods and ideas of teaching and have schools, teachers, and teacher educators to implement them in practice—that is the truth even though everyone realized the benefits of new ways of doing things [85].

When it comes to sustainability, one critical factor of the implementation and development of sustainability education is psychological: the way people adjust, behave, and understand sustainability and the need for sustainability education. Kollmuss and Agyeman [86] noted already at the beginning of the 2000s that there is a gap between the possession of environmental knowledge and environmental awareness and displaying pro-environmental behavior. The relationship between knowledge and practical actions is far from simple, nor is the role of education much clearer [87]. For example, among children, the ways parents think about climate change and nature preservation politics can have

a major influence on how children behave even if they are familiar with the phenomenon and its reasons and causes [88]. Ratinen and Uusiautti [16] analyzes the connection between environmental knowledge and hope in children, and perceives that their hopefulness is not always based on realistic considerations, nor does accurate knowledge about climate change always mean optimistic attitude toward the future. Indeed, Bonnett [89] points out that it is important to remember that a profound understanding of sustainability includes the need for spiritual survival, referring to the understanding of what we are and how we should relate to the world around us. According to Bonnett [89], education should, therefore, focus on both short-term and long-term agendas when developing a sense of a right relationship with nature in order to surpass the various psychological obstacles of positive adaptation of new attitudes and behaviors. Leaning on this idea, the goal of ASE is to have social, environmental, and economic sustainability written inside of us, to have it eventually a natural part of everyone that does not depend on random background factors.

Another psychologically important viewpoint of education is that at the moment, we struggle with the environmental pressures spread in the media and vividly and uncritically (in terms of what kind of arguments people use for "for and against" the phenomenon) discussed especially in the social media. It is important that educators understand how all this affects children and what kinds of strategies they use to cope with, for example, the environmental concerns we are surrounded currently (see [90]). Do we cause or relieve anxiety and healthy behaviors, and do we pay enough attention to these emerging issues?

As the goal of ASE is to enhance social and environmental responsibility, it would be important to understand and remember that sustainable development arises from well-being: where there is well-being, there is an opportunity to do healthy choices and adopt sustainable attitudes and behaviors in a healthy manner. Leskisenoja and Uusiautti [47] call for this type of educational psychological understanding in the Arctic. Their analysis shows that becoming familiar with their strengths increases students' self-cognizance and helps them recognize and employ their resources in a new way. Most mportantly, it increases their sense of self-worth and belief in their ability to cope with challenges and pressures in life. Furthermore, it is crucial to notice the positive effect on social relationships. The finding is important for ASE because the strength of future Arctic communities lies in communality, a positive atmosphere, and teamwork, and mutual understanding about the benefits of sustainability. This also resembles our positive psychological idea, where flourishing people are able to pay attention to their individual well-being and communal well-being, too [91].

It seems that today's educational systems are increasingly engaged in competition, economic growth, efficiency, and productivity. Simultaneously, people's malaise increases. How does sustainable development fit in the picture? When researching enterprises and business organizations, Nguyen and Slater's [92] introduces the concept of "a sustainability sweet spot", referring to the state of the organization where the performance is environmentally and socially responsible and superior in an economic sense, too. Could the educational sweet spot be found through the ASE? Education can show the way and become the major change agent toward profound sustainability thinking, which necessitates that the change agents have adopted positive and optimistic attitudes and behaviors. Thus, when we talk about the ASE, we do not talk about just "technological tricks" of providing education in flexible and sustainable manner but merely positive, caring pedagogy that directs the ways teachers and educators, including multi-professional collaborators, employ the various methods of teaching (see, e.g., [93]). Educational psychology thus directs attention to the positive development of students, their well-being, and the well-being of a whole education community. Teaching and showing hope, optimism, and respect in oneself, others, and the future are the keys to sustainable development in people and communities too.

4. Conclusion: The evaluation, Implementation Opportunities, and Future of the ASE Model

The purpose of this article was to draw a picture of the ASE by leaning on (1) literature and research published in the field and (2) based on our own research and familiarity with the Arctic

issues (e.g., [44–49,51,55,57,74,79]) and through this type of theoretical discussion, to show the critical elements of sustainability education that can be addressed with the ASE. Certainly, to be able to develop the model and prove its functionality, it needs to be tested in practice, real-life education situations and contexts (e.g., [94]). In addition, the model must be evaluated in terms of its fit with the curriculum and competencies, ASE would produce [95]. To know its usability in practice, we need information about how students welcome the model, how teachers perceive it, and what kind of meaning the approach introduced in the ASE has.

Hjorth and Madani [96] provide some interesting viewpoints for evaluating our sustainability model critically. First, it is important to carefully analyze the conceptual basis of the ASE. How to make sure that teachers, students, parents, and others understand the concepts similarly? For example, Hjorth and Madani [96] compare sustainable development with a concept of freedom: it is not so much a product but a process, which is a quality issue by its fundamental nature.

It is reasonable to ask whether any one of us understands the reality well enough [96]. Have we jumped into too hasty conclusions, or is the ASE based on facts and profound understanding about the situation in the Arctic and elsewhere? In addition, there is not just one right solution, and while we wish to claim that the ASE could provide useful viewpoints to other regions or to sustainable education, in general, we could not know this for sure before the model has been implemented in practice. It is likely that it is extremely difficult or even impossible to measure how sustainability education affects. Hjorth and Madani [96] call it a moving target, which can make the objective measurement of the ASE difficult. Fundamentally, it is, however, a matter of change that happens in people. To be successful, the ASE model thus requires systematic implementation and collaboration between the various actors that we have introduced earlier in this article. In chapter 3, we suggested the use of AI as a practical tool to evaluate the ASE. Eventually, sustainability is about the whole society and not about just one sector, as mentioned by Hjorth and Madani [96]. Indeed, the ASE calls for a multi-dimensional and multi-perspective approach to societal structures and processes regarding sustainability (see also [97,98]).

However, there are also options to the holistic picture, and one would be to analyze the ASE as a hierarchical structure. Yet, it would be difficult to know which elements represent lower or higher levels than others, or how the different levels are interconnected. Supposedly, to sustainability education, it is crucial to just perceive nature as the higher-level element and human beings with their own systems as a part of nature (see also [99]).

Next, we would like to spend a moment to think about the measurement and implementation of the ASE. It would be necessary to have teachers in teacher training and in-service training to reflect their teaching activities with regards to the ASE. How does the model work? What are its strengths, and are they clear obstacles to its usability? If the obstacles are merely administrative-organizational, it will be easier to surpass them. But if the obstacles lay within people's minds and learned behaviors, it will be more difficult to influence. In addition, we need practical information about how teachers, students, parents, school authorities, and other collaborators perceive the ASE. As mentioned in Chapter 3, psychological aspects, such as a denial of climate change or insecurity about one's chances to make an impact, can be revealed through empirical research [100]. Teachers need abilities to help students analyze their own worldviews and prevailing societal values and assess whether they are in contradiction with pro-environmental activities and sustainability development, in general.

We, therefore, present as the next steps that the ASE would move from this theoretical level to practice. This would be done by a multi-professional expert group that would operationalize the ASE into a practical model that would be tested in education. For example, we from the University of Lapland have the opportunity to take the model through the Teacher Training School to other schools in the Finnish Lapland to execute the research, implementation, and development activities. The context of Lapland is, naturally, an ideal platform for this type of action research [101]. Through systematic research and operationalization into practices at the various levels illustrated in Figure 1,

the measurement of the usability of the ASE becomes possible. This theoretical article is, therefore, the start of a process that will progress through cycles of empirical testing and conceptual development.

A sustainable future and the construction of a new kind of sustainable future begins with education. Bringing it to a head, we may say that there is no other way than upbringing and education that influences people's learning, awareness, choices, and true changes in behaviors. Individual learning lays the foundation of societal change. Through the ASE, the school can be a great participant and change-maker that renews the society. Although the ASE necessitates teachers and the school the tolerance of insecurity and readiness to learn in a communal manner, the direction is positive. The implementation of ASE needs testing and wide collaboration, but when renewing education toward eco-social, sustainable civilization, the educators' courage and strength to act in the direction of vital and positive future can be the key. It is the children they educate: children who do not have prejudices or restrictive models or conceptions in mind.

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